

DESCRIPTION OF TWO NEW SPECIES AND ONE NEW RECORD SPECIES OF THE GENUS *ERYTHMELUS* ENOCK (HYMENOPTERA, MYMARIDAE) FROM XINJIANG

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Abstract In this paper, two new species, *Erythmelus* (*Erythmelus*) *wenquanensis* sp. nov. and *Erythmelus* (*Erythmelus*) *brevifuniculatus* sp. nov., and one newly recorded species, *Erythmelus* (*Erythmelus*) *hygiivorus* Viggiani et Jesu of the genus *Erythmelus* Enock are described and illustrated from China, Xinjiang. A key to the 5 species from Xinjiang is provided. All the specimens examined are deposited in the College of Life Science and Technology, Xinjiang University, and the Biological Control Research Institute, Fujian Agriculture and Forestry University.

Key words Hymenoptera, Mymaridae, *Erythmelus* Enock, new species, Xinjiang.

The genus *Erythmelus* Enock is similar to *Anaphes* and *Omyomymar* (Schauff, 1984). Beardsley & Huber (2000) erected two subgenera under the genus: *Parallalaptera* with funicle 5-segmented in female. *Erythmelus* with funicle 6-segmented in female.

Up to now, the genus includes 57 species in the world. Only 12 species were known to parasitize the eggs of Tingidae and Miridae (Hemiptera), Cicadellidae and Diaspididae (Homoptera), Tortricidae (Lepidoptera), Agromyzidae (Diptera), the others are still unknown about the hosts and biology (Hu, 2003).

In this paper, two new species and one newly recorded species were revealed from Xinjiang. The specimens studied here were collected by sweeping, therefore their biological data are unavailable. The descriptions are based on specimens slide-mounted in Canadian balsam, terminology generally follows that of Beardsley & Huber (2000). All the measurements were taken at 100 ×, 200 ×, or 400 × with an Olympus compound microscope and eye-piece reticle. Body length are measured with millimeters (mm), other measures are relative. All the materials examined are deposited in the Life Science and Technology College, Xinjiang University and Biological Control Research Institute, Fujian Agriculture and Forestry University.

Erythmelus Enock

Erythmelus Enock, 1909. *Trans. Ent. Soc. Lond.*, 455. Type species: *Erythmelus goochi* Enock, by monotypy.

Parallalaptera Enock, 1909. *Trans. Ent. Soc. Lond.*, 454. Type species: *Parallalaptera panis* Enock, by monotypy. Synonymy by Schauff, 1984: 45.

Enaesius Enock, 1909. *Trans. Ent. Soc. Lond.*, 456. Type species: *Enaesius agilis* Enock, by monotypy. Synonymy by Debauche, 1948:

192.

Anthemiella Girault, 1911. *Proc. Ent. Soc. Wash.*, 90: 185. Type species: *Anthemiella rex* Girault, by original designation. Synonymy by Schauff, 1984: 45; previous synonymy by Girault (1912 [112]: 297) under *Parallalaptera*.

Erythmellelus Viggiani & Jesu, 1985. *Redia*, 487. Type species: *Erythmelus hygiivorus* Viggiani and Jesu, by original designation. Synonymy by Triapitsyn.

Diagnosis. Four-segmented tarsi; metasoma subsessile; mesophragma not projecting beyond mesosomal foramen; mandible unidentate; female funicle 5- or 6-segmented; clava 1-segmented; male flagellum 10- or 11-segmented; metanotum extending over propodeum; hypogygium prominent, extending to apex of gaster, ploughshare-shaped.

Key to species of *Erythmelus* Enock from Xinjiang.

1. Antennae with funicle 5-segmented (subg. *Parallalaptera* Enock) ...
..... *Erythmelus* (*Parallalaptera*) *rex* (Girault)
Antennae with funicle 6-segmented (subg. *Erythmelus* Enock) ... 2
2. F4 as long as F6 *Erythmelus* (*Erythmelus*) *picipis* (Girault)
F4 shorter than the length of F6 3
3. F6 with 2 sensory ridges
... *Erythmelus* (*Erythmelus*) *hygiivorus* Viggiani et Jesu, new. rec.
F6 with 1 sensory ridge 4
4. Apical half of mesoscutum yellow; F4 distinct longer than the half length of F6; fore wing marginal cilia shorter than wing's width twice; fore wing length: width less than 5; male genitalia's length longer than hind tibia
..... *Erythmelus* (*Erythmelus*) *wenquanensis* sp. nov.
Apical half of mesoscutum yellowish brown; F4 as long as the half length of F6; fore wing marginal cilia longer than wing's width twice; fore wing length: width more than 5; male genitalia's length as long as hind tibia *Erythmelus* (*Erythmelus*) *brevifuniculatus* sp. nov.

Erythmelus (*Erythmelus*) *wenquanensis* sp. nov. (Figs 1–4)

Female. Body length 0.78 mm. Body yellow brown except half apex 1/2 of mesonotum, base 2

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segments of gaster, legs and antenna yellowish brown; wings hyaline on the disc.

Head triangle, slightly wider than long (32:31); transverse trabecula longer than the distance of torulus, mandible with 1 tooth, vertex with narrow, transverse striation, 4 setae. Ocelli obtuse-triangle, with 2 setae; eyes occupying 0.65 (20:31) of head. Antenna (Fig. 1) ratio as follows: radicle + scape: pedicel: funicle (1–6 segment) : clava = 21.0:7.5: (2.5:4.0:4.0:5.0:5.0:9.0) : 25.5, radical and scape combined, scape cylindrical, 5.25 times as long as wide (21:4), with slightly transverse striation; pedicel nearly pear-shaped, about 1.88 times as long as wide (7.5:4.0); F1 shortest, slightly longer than wide, apexoblique, F6 widest and longest, slightly shorter than F4 and F5 combined; clava metuliform, 6.38 times as long as wide (25.5:4.0), slightly longer (or isometry) than from F3 to F6 combined (25.5:23.0), only F6 with 1 sensory ridge, clava with 6 sensory ridges, from funicle to clava with dense fuzz.

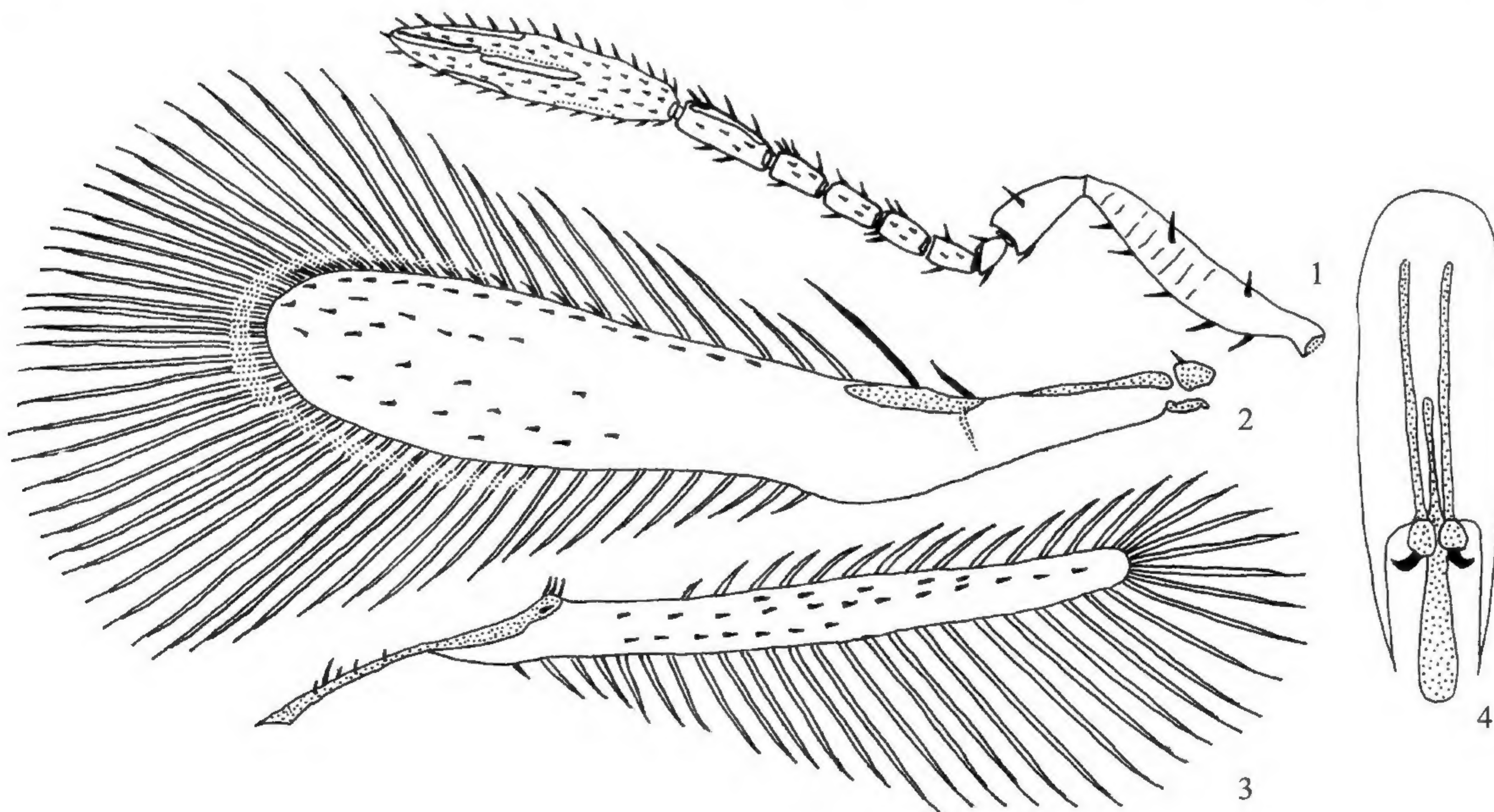
Mesosoma with narrow longitudinal striation, pronotum with 2 lobe, each side of lobe with 2 setae; mesoscutum broad (19:32), each side of notaulus, lateral lobe and axilla with 1 macrotrichia respectively; scutellum slightly longer (or shorter) than mesoscutum, about longer than wide, with 2 placoid sensilla very close to each other. The apex of fore wing (Fig. 2) slightly round, 4.65 times as long as wide (93:20), vein occupying 0.37 of wing length (34:93), hypochaeta much close to proximal macrochaeta, microtrichia of disc on apical half, scare

and scattered; marginal cilia short, 1.6 times longer than wing width (32:20). Hind wing (Fig. 3) slightly longer (or isometry) than fore wing, 19.6 times as long as wide (98:5), with 2 rows of cilia, marginal cilia shorter than fore wing's, 4.6 times longer than hind wing's width (23:5). Fore tibia with dense setae, apical with 1 spur, basitarsus of fore leg with a row of pectiniform spines.

Gaster slightly longer than mesosoma, distinctly shorter than the head and mesosoma combined (62:91); ovipositor based the third of gaster, 1.64 times length of hind tibia (54:33), exerted part beyond of gaster by 0.15 length of ovipositor (8:54).

Male. Body length 0.97 mm. The main characters similar to the female except the normal sexually dimorphic characters and the following. The middle of scape distinct intumescence, eleventh funiculus slightly shorter than other funiculus, equal cylindrical; phallobase scrotiform (Fig. 4), with penis vale, apex acute, volsellar digitus developed, toward outer curvature, phallobase slightly longer than aedeagus (46:42), aedeagal apodeme U-shaped, distinct longer than aedeagus, about 1.53 times longer than latter (23:15), aedeagus tongue-shaped, straight. Male genitalia's length longer than hind tibia length, about 1.25 of latter (50:40).

Holotype ♀, Wenquan, Xinjiang (44°58'N, 81°01'E), 16 July 2001, coll. HU Hong-Ying. Paratypes: Xinjiang, 2 ♀♀, same data as holotype; 1 ♀, Heshuo (35°38'N, 82°38'E), 7 Aug. 2001, coll. HU Hong-Ying; 5 ♀♀, Hejing (42°06'N, 82°28'E), 9 Aug. 2001, coll. HU Hong-Ying; 2 ♀♀,



Figs 1–4. *Erythnelus (Erythnelus) wenquanensis* sp. nov. 1. Female antenna, ♀, 10 × 40 times. 2. Fore wing, ♀, 10 × 20 times. 3. Hind wing, ♀, 10 × 20 times. 4. Male genitalia, ♂, 10 × 40 times.

Tuoli (46° 16' N, 83° 35' E), 29 July 2007, coll. ZHANG Tie-Gang; 1 ♀, Tacheng (46° 49' N, 83° 07' E), 30 July 2007, coll. ZHANG Jing-Jing; 1 ♀, Tuoli (45° 57' N, 83° 35' E), 29 July 2007, coll. Hexi; 1 ♂, Hefeng (46° 16' N, 83° 35' E), 1 Aug. 2007, coll. XU Jian-Hua.

Body length 0.73 – 0.98 mm.

Host. Unknown.

Distribution. Xinjiang (Heshuo, Hejing, Tacheng, Hefeng, Tuoli, Wenquan).

Remarks. This species is similar to *E. goochi* Enock, but can be easily distinguished from latter by the length of funicle, F6 of new species slightly shorter than F4 and F5 combined; length clava shorter than scape, pedicellus and F1 to F4 combined; marginal cilia of fore wing distinct longer than wing width.

Etymology. The new species is named after the collected place of the holotype.

Table 1. The ratios of each legs segments *Erythmelus* (*Erythmelus*) *wenquanensis* sp. nov. (10 × 20 times)

	Fore leg	Middle leg	Hind leg
Femur	29	22	26
Tibia	24	23	33
First tarsus	12	13	12
Second tarsus	8	9	10
Third tarsus	7	9	9
Fourth tarsus	6	7	7

***Erythmelus* (*Erythmelus*) *brevifuniculatus* sp. nov.**
(Figs 5 – 8)

Female. Body length 0.61 mm. Body yellow brown except apex half of mesoscutum yellow; proximal gaster yellowish; antenna, legs and vein yellowish brown; wings hyaline on the disc.

Head round, slightly longer than wide (28:25); transverse trabecula longer than the distance of torulus, mandible with 1 tooth. Ocelli obtuse-triangle; eyes occupying 0.68 (19:28) of head. Antenna (Fig. 5) ratio as follows: radicle + scape: pedicel: funicle (1 – 6 segment) : clava = 19.5:7.5: (2.5:2.5:3.0:3.5:4.0:7.0) : 21.0, radicle and scape combined, scape cylindrical, 6.5 times as long as wide (19.5:3.0); pedicel nearly pear-shaped, about 1.88 times as long as wide (7.5:4.0); F1 shortest, slightly longer than wide, apex oblique, F6 widest and longest, slightly shorter than F4 and F5 combined, 2 times length of F4; clava metuliform, 3.2 times as long as wide (21.0:5.5), slightly longer than from F3 to F6 combined (21.0:17.5), only F6 with 1 sensory ridge, clava with 6 sensory ridges, from funicle to clava with dense fuzz.

Mesosoma with narrow longitudinal striation, pronotum with 2 lobe, each side of lobe with 2 setae; mesoscutum broad (20:19), each side of notaulus,

lateral lobe and axilla with 1 strong seta respectively; scutellum slightly shorter (or isometry) than mesoscutum, about wider than long, with 2 placoid sensilla very close each other. The apex of fore wing (Fig. 6) slightly round, 5.27 times as long as wide (79:15), vein occupying 0.36 of wing length (28:79), hypochaeta much close to proximal macrochaeta, with cilia on distal, scare and scattered; marginal cilia fairly long, 2.13 times longer than width (32:15). Hind wing (Fig. 7) as long as (or shorter than) fore wing, 19.5 times as long as wide (78:4). With 1 incomplete row of cilia, marginal cilia shorter than fore wing's, 4.75 times longer than hind wing's width (23:4). Fore tibia with dense setae, apex with 1 spur, basitarsus of fore leg with a row of pectiniform spines.

Gaster slightly longer than mesosoma (48:43), distinctly shorter than the head and mesosoma combined (48:71); ovipositor based the second of gaster, 1.58 times length of hind tibia length (41:26), exerted part beyond of gaster by 0.19 length of ovipositor (8:41).

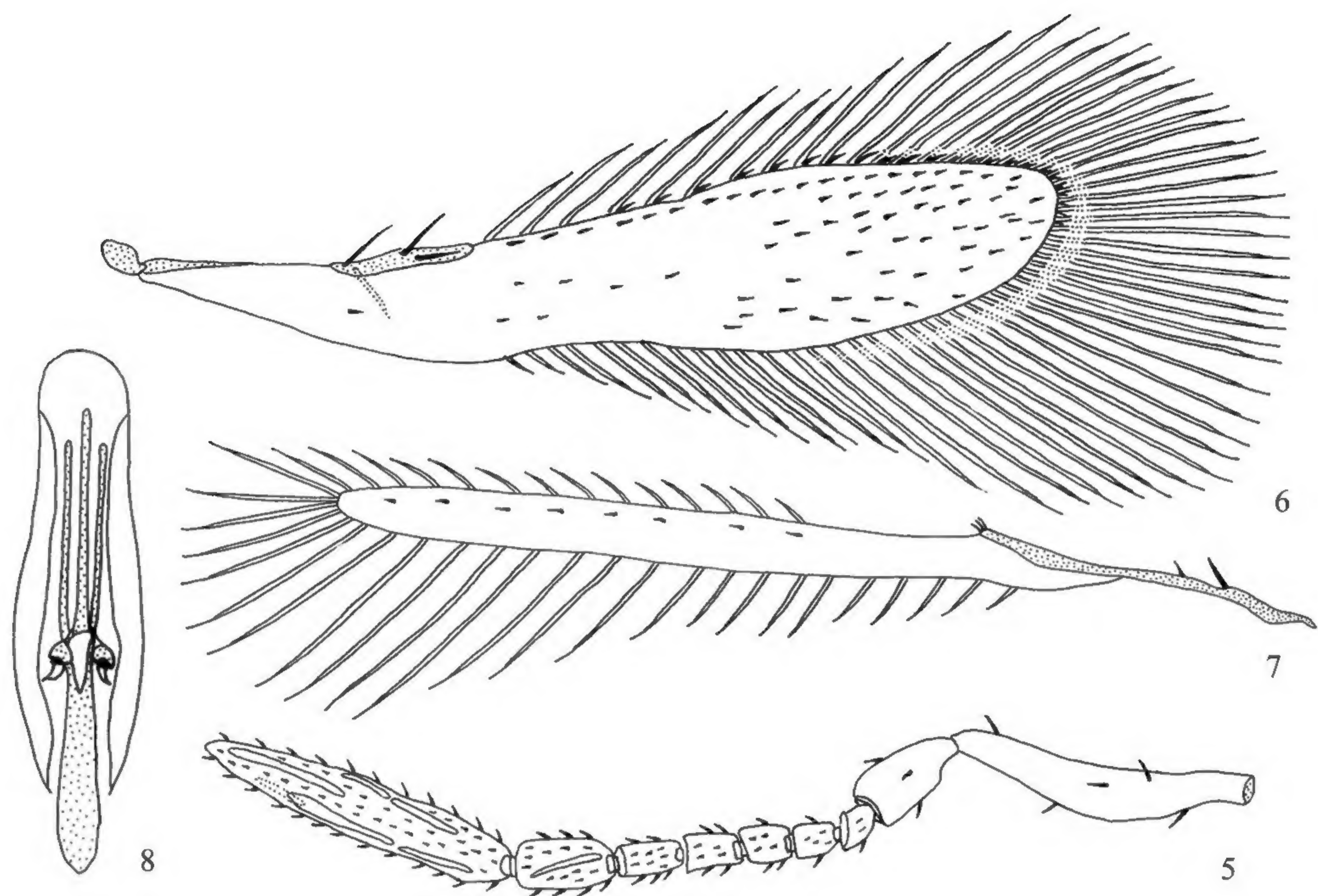
Male. Body length 0.6 mm. The main characters similar to the female except the normal sexually dimorphic characters and the following. Fore wing with more microtrichia; scape and pedicel short, thickness; antenna from radicle to apex become longer, each funiculus with 6 sensory ridges. Male genitalia (Fig. 8) phallobase developed, volsellar digitus, penis vale distinct, aedeagal apodeme U-shaped, 1.5 times longer than aedeagus (13.5:9.0). Male genitalia's length as long as hind tibia length.

Holotype ♀, Jinghe, Xinjiang (44° 02' N, 81° 46' E), 15 July 2001, coll. HU Hong-Ying. Paratypes: Xinjiang, 1 ♀, 1 ♂, same data as holotype; 6 ♀ ♀, 4 ♂ ♂, Urumqi (44° 08' N, 86° 37' E), 22 Aug. 2001, coll. HU Hong-Ying; 1 ♀, Xinyuan (43° 01' N, 84° 57' E), 7 Aug. 1997, coll. MA De-Ying; 2 ♀ ♀, 2 ♂ ♂, Xinyuan (43° 01' N, 84° 57' E), 16 July 2001, coll. HU Hong-Ying; 1 ♀, Kuitun (40° 14' N, 80° 09' E), 17 July 2001, coll. HU Hong-Ying; 2 ♀ ♀, Shihezi (43° 20' N, 84° 45' E), 12 July 2001, coll. HU Hong-Ying; 2 ♀ ♀, Urumqi (44° 08' N, 86° 37' E), 22 July 2001, coll. SUN Tao; 1 ♀, Heshuo (35° 38' N, 82° 38' E), 7 Aug. 2001, coll. HU Hong-Ying; 1 ♀, Akesu (41° 09' N, 80° 19' E), 18 June 2001, coll. WU Wei; 2 ♀ ♀, Tuoli (46° 16' N, 83° 35' E), 29 July 2007, coll. XU Jian-Hua; 1 ♀, Emin (46° 33' N, 83° 45' E), 29 July 2007, coll. ZHANG Tie-Gang; 1 ♀, Emin (46° 33' N, 83° 32' E), 30 July 2007, coll. HE Xi.

Body length 0.56 – 0.66 mm.

Host. Unknown.

Distribution. Xinjiang (Akesu, Heshuo, Urumqi, Shihezi, Kuitun, Jinghe, Tuoli, Emin,



Figs 5 – 8. *Erythmelus (Erythmelus) brevifuniculatus* sp. nov. 5. Female antenna, ♀, 10 × 40 times. 6. Fore wing, ♀, 10 × 20 times. 7. Hind wing, ♀, 10 × 20 times. 8. Male genitalia, ♂, 10 × 40 times.

Wenquan, Xinyuan).

Remarks. This species is similar to another new species *E. wenquanensis* sp. nov., but differs from the latter by the distal half of mesoscutum yellowish brown; F4 as long as the half length of F6; fore wing marginal cilia longer than wing’s width twice; fore wing length; width more than 5; male genitalia as long as hind tibia.

Etymology. The name of the new species *brevifuniculatus* is composed of the Latin *brevi-* (means “short”) and the Latin *funiculus* (means “funicle”), meaning the funicle of the new species is thick and short.

Table 2. The ratios of each legs segments *Erythmelus (Erythmelus) brevifuniculatus* sp. nov. (10 × 20 times)

	Fore leg	Middle leg	Hind leg
Femur	24	20	21
Tibia	27	29	26
First tarsus	8.5	9.5	9.0
Second tarsus	6.0	7.5	7.5
Third tarsus	6.0	7.5	6.5
Fourth tarsus	5.0	6.5	5.0

Erythmelus (Erythmelus) lygivorus Viggiani et Jesu
New record to China (Figs 9 – 11)

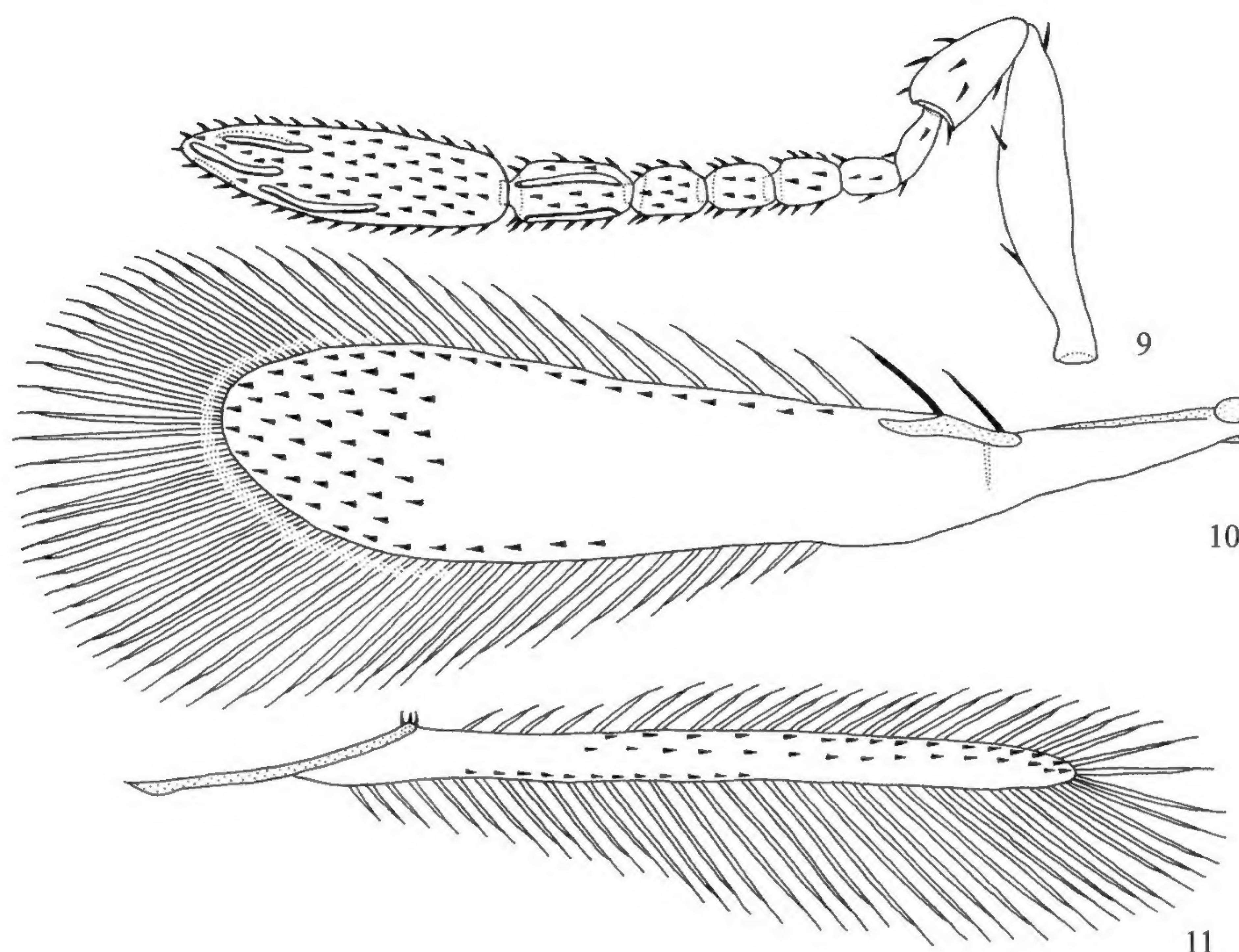
Erythmelus lygivorus Viggiani et Jesu, 1985. *Redia*, 68: 485 – 491.

Female. Body length 0.97 – 1.08 mm. Body black brown except proximal gaster, legs, antenna yellowish brown; tarsis yellowish.

Head round, slightly longer than wide (41 – 46:

40 – 42); transverse trabecula longer than the distance of torulus, mandible with 1 tooth; vertex with narrow, transverse striation, 4 setae. Ocelli obtuse-triangle; eyes occupying 0.61 – 0.63 (26 – 28: 41 – 46) of head. Antenna (Fig. 9) ratio as follows: radicle + scape: pedicel: funicle (1 – 6 segment) : clava = 28.0 – 34.0: 10.0 – 11.5: (6.0 – 7.0: 5.0: 5.5: 6.0: 6.0: 10.5 – 11.0) : 28.0 – 32.0, radicle and scape combined, scape cylindrical, 5.23 – 5.60 times as long as wide (28.0 – 34.0: 5.0 – 6.5); pedicel nearly pear-shaped, about 1.64 – 1.82 times as long as wide (10.0 – 11.5: 5.5 – 7.0) F1 respectively slightly longer than wide, apex oblique, F2 shortest, cylindrical, F6 thickness and longest, slightly shorter than F5 and F6 combined; clava metuliform, 1.00 – 1.12 times as long as wide (28.0 – 32.0: 28.0 – 28.5), F6 with 2 sensory ridges, clava with 5 sensory ridges, from funicle to clava with dense fuzz.

Pronotum with 2 lobe, each side of lobe with 1 setae; mesoscutum with reticulate sculpture, broad (38 – 40: 26 – 28), each side of notaulus, lateral lobe and axilla with 1 macrotrichia respectively; scutellum with narrow longitudinal striation, slightly shorter (or isometry) than mesoscutum, about longer than wide, with 2 placoid sensilla very close to each other. The apex of fore wing (Fig. 10) slightly ovate, 4.38 – 4.90 times as long as wide (117.5 – 140.0: 24.0 – 32.0), vein occupying 0.32 – 0.34 of wing length (32.0 – 36.0: 117.5 – 140.0), hypochaeta close to proximal macrochaeta, with apex of disc (about 1/4 – 1/3) more or less setose, remainder of disc almost bare;



Figs 9 – 11. *Erythmelus (Erythmelus) lygivorius* Vigganin et Jesu., ♀. 9. Female antenna, 10 × 40 times. 10. Fore wing, 10 × 20 times. 11. Hind wing, 10 × 20 times.

marginal cilia fairly short, 1.0 – 1.5 times longer than width (32 – 36 : 24 – 32). Hind wing (Fig. 11) shorter than fore wing, 16.88 – 18.33 times as long as wide (110 – 135 : 6 – 8). With 2 rows of cilia; marginal cilia shorter than fore wing's, 3.25 – 5.00 times longer than hind wing's width (26 – 30 : 6 – 8). Fore tibia with dense setae, apex with 1 spur, basitarsus of fore leg with a row of pectiniform spines.

Table 3. The ratios of each legs segments *Erythmelus (Erythmelus) lygivorius* Vigganin et Jesu (10 × 20 times).

	Fore leg	Middle leg	Hind leg
Femur	32 – 38	26 – 30	28 – 34
Tibia	32 – 38	44 – 52	44 – 52
First tarsus	12.0 – 15.5	16 – 20	16.5 – 21.5
Second tarsus	8.0 – 9.5	10.5 – 12.0	11.5 – 13.0
Third tarsus	7.5 – 9.0	10.0 – 11.5	9.5 – 12.0
Fourth tarsus	7.0 – 7.5	6.5 – 8.5	7.0 – 8.0

Gaster distinct longer than mesosoma, but distinctly shorter than the head and mesosoma combined (82 – 92 : 110 – 124); ovipositor based the first segment of gaster, 2.05 – 2.07 times length of hind tibia (90.0 – 107.5 : 44.0 – 52.0), exerted part beyond of gaster by 0.09 – 0.24 length of ovipositor (8.0 – 26.0 : 90.0 – 107.5).

Male. Unknown.

Material examined. 1 ♀, Tuoli, Xinjiang (46°16'N, 83°35'E), 29 July 2007, coll. ZHANG Tie-Gang; 1 ♀, Emin (46°33'N, 83°45'E), 29 July 2007, coll. XU Jian-Hua.

Host. *Lygus* spp. (F. Bin. Allotipo, 1985).

Distribution. Xinjiang (Tuoli, Emin); France, Hungary, Italy, Spain.

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新疆爱丽缨小蜂属两新种及一新纪录种记述（膜翅目，缨小蜂科）

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摘 要 记述采自新疆的爱丽缨小蜂属 *Erythmelus* Enock 2 新种，温泉爱丽缨小蜂 *Erythmelus* (*Erythmelus*) *wenquanensis* sp. nov., 短索爱丽缨小蜂 *Erythmelus* (*Erythmelus*) *brevifuniculatus* sp. nov., 中国 1 新纪录种，盲蝽爱丽缨小蜂 *Erythmelus* (*Erythmelus*) *hygiworus* Viggiani et Jesu, 提供了新疆爱丽缨小蜂属 5 个种的检索表。模式标本保存在新疆大学生命科学与技术学院昆虫研究室和福建农林大学生物防治研究所。

温 泉 爱 丽 缨 小 蜂，新 种 *Erythmelus* (*Erythmelus*) *wenquanensis* sp. nov. (图 1~4)

正模 ♀，新疆温泉县，2001-07-16，胡红英采。副模：2 ♀♀，来源同正模；1 ♀，和硕县，2001-08-07，胡红英采；5 ♀♀，和静县，2001-08-09，胡红英采；2 ♀♀，托里县，2007-07-29，张铁钢采；1 ♀，塔城，2007-07-30，张晶晶采；1 ♀，托里县，2007-07-29，何茜采；1 ♂，和丰县，2007-08-01，徐建华采。

分布：新疆（和硕县、和静县、塔城、和丰县、托里县、温泉县）。

新种外部形态特征与 *E. goochi* Enock 很相似，主要区别是：新种的第 6 索节略短于第 4、5 索节之和；棒节短于柄节至第 4 索节长度之和；前翅缘毛明显长于翅宽。

词源：新种以模式产地命名。

短 索 爱 丽 缨 小 蜂，新 种 *Erythmelus* (*Erythmelus*) *brevifuniculatus* sp. nov. (图 5~8)

正模 ♀，新疆精河县，2001-07-15，胡红英采。副模：1 ♀，1 ♂，来源同正模；6 ♀♀，4 ♂♂，乌鲁木齐市，2001-

08-22，胡红英采；1 ♀，新源县，1997-08-07，马德英采；2 ♀♀，2 ♂♂，新源县，2001-07-16，胡红英采；1 ♀，奎屯市，2001-07-17，胡红英采；2 ♀♀，石河子市，2001-07-12，胡红英采；2 ♀♀，乌鲁木齐市郊，2001-07-22，孙涛采；1 ♀，和硕县，2001-08-07，胡红英采；1 ♀，阿克苏市，2001-06-18，吴卫采；2 ♀♀，托里县，2007-07-29，徐建华采；1 ♀，额敏县，2007-07-29，张铁钢采；1 ♀，额敏县，2007-07-30，何茜采。

分布：新疆（阿克苏市、和硕县、乌鲁木齐市、石河子市、奎屯市、精河县、托里县、额敏县、温泉县、新源县）。

新种与本属中的任何种都有明显的差异，与另 1 新种温泉爱丽缨小蜂 *Erythmelus* (*Erythmelus*) *wenquanensis* sp. nov. 较相似，区别之处：中胸盾片端部淡黄褐色；第 4 索节等长于第 6 索节的一半；前翅缘毛长于翅宽的 2 倍；前翅的长宽比值大于 5；雄性外生殖器的长度等长于后足胫节。

词源：新种种名 *brevifuniculatus* 为组合词，由拉丁词 *brevi-*（意为“短的”）和 *funiculus*（意为“索节”）组成，指新种索节粗短。

盲 蝽 爱 丽 缨 小 蜂 *Erythmelus* (*Erythmelus*) *hygiworus* Viggiani et Jesu 中国新纪录 (图 9~11)

研究标本：1 ♀，新疆托里县，2007-07-29，张铁钢采；1 ♀，额敏县，2007-07-29，徐建华采。

分布：新疆（托里县、额敏县）；法国，匈牙利，意大利，西班牙。

关键词 膜翅目，缨小蜂科，爱丽缨小蜂属，新种，新疆。

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